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Study on the Value Evaluation of Intellectual Property Pledge Financing

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Abstract

As an intangible asset, intellectual property can not only improve the asset value of the company, but also obtain financing through pledge. Especially for some small and medium-sized technology-based companies in China, intellectual property financing has become one of their important ways. However, at present, there are still some problems in the value evaluation of intellectual property pledge financing, such as the uncertainty of intellectual property rights, the lack of a unified evaluation system, the lack of relevant laws and regulations, etc., which have caused certain difficulties to the value evaluation of intellectual property rights. At present, the income method is mainly used in the value evaluation of intellectual property pledge financing in China. Taking Hangzhou Xiye Technology Co., Ltd. as an example, this paper studies the applicability of this value evaluation method, points out relevant problems, and puts forward relevant suggestions, so as to improve the value evaluation level of intellectual property pledge financing in China.

Key words: Intellectual property; Financing; Value evaluation

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1. THE INTRODUCTION

Today is an era of "knowledge economy". For companies, innovation can occupy more market share and stimulate economic growth, among which technology-based companies occupy an important position in this era. But because of many small and medium-sized technology-based companies in most of the early stage of the development of light has the characteristics of assets, high investment, high risk, causing them to hard to from the traditional financing way financing, and intellectual property pledge financing way is just to solve the small and medium-sized technology firms that face the problem, therefore, more and more enterprises paid attention to the building of their own intellectual property value, in order to obtain high financing funds.

Intellectual property pledge financing is through the relevant institutions to enterprise's intellectual property rights must be assessed, finally to determine the value of a kind of way, at present in China, most intellectual property evaluation depends on the assessment of income approach, this way, although to a certain extent, solve the problem of intellectual property valuation, but also has certain limitation, this approach also led to the intellectual property valuation may exist the phenomenon of deviation.

Compared with western developed countries, our country's intellectual property pledge financing evaluation is just a start stage, the value of intellectual property pledge financing at this stage assessment is bound to experience all sorts of problems, not only is the problem that evaluation way, but also the related evaluation system, laws and regulations, the problem on the assessment team, to further promote the development of our country intellectual property pledge financing evaluation, will is the key to solve these problems.

Value assessment of the intellectual property pledge financing in our country is still at a low level of development, and for the research scope of the problem is more dispersed, I on the basis of existing theory, combined with Hangzhou Wild West Science and Technology co., LTD., a specific case to try to discusses the means of

the evaluation of earnings, and emphatically analyzed our country intellectual property pledge financing problems of value assessment, to a certain extent can broaden the research scope of the problem in academia. In addition, the research on the value evaluation of intellectual property pledge financing can also provide a certain theoretical basis for small and medium-sized technology companies in the process of intellectual property pledge financing.

At present, the market scale of intellectual property pledge financing in China is continuously expanding. China has made some progress in both the capital scale and the pledge project, which is of great benefit to solve the problem of small and medium-sized technology companies in China. But also should pay attention to the problems that exist in the process of intellectual property pledge financing, such as the valuation problem, risk problems, evaluation system, etc., in this paper, based on small and medium-sized technology firms, using the case method correlation research and analysis of the above problems, and puts forward relevant countermeasures and Suggestions, in order to improve the level of our country intellectual property pledge financing evaluation.

Firstly, this paper analyzes the current research status of the value assessment in intellectual property pledge financing at home and abroad, and finds out the similarities and differences between the two. Secondly, the advantages and disadvantages of the three basic evaluation methods are analyzed. Furthermore, through the analysis of relevant cases, the paper finds out the problems existing in the value assessment of intellectual property pledge financing, and puts forward relevant suggestions. In the end, the thesis is summarized and prospected, and the shortcomings of this thesis are summarized. At the same time, the prospect of value assessment in the financing of knowledge product pledge is also prospected.

Based on the evaluation of the research on intellectual property pledge financing problems and countermeasures, with the method of the keywords retrieval, in CNKI, Wan Fang, Baidu academic retrieval “intellectual property pledge financing” and “intellectual property value assessment”, “value” the three key words search nearly 3-5 years of relevant literature, and integrate the literature to find valuable information for the thesis writing.

In order to better study the problems existing in the value evaluation of intellectual property pledge financing, this paper adopts the case analysis method, taking the intellectual property financing of Hangzhou Xye Technology Co., Ltd. as an example to analyze the specific application of income method and discuss the existing problems.

2. LITERATURE REVIEW

2.1 Foreign Research Status

From the perspective of the mode of intellectual property pledge financing, this paper chooses the modes of the United States, Germany and Japan among the developed countries to describe.

In the United States, the government cannot effective intervention to the market, so there was dominated by the following modes: the first is the small business administration mode, this mode, the government in order to promote private capitalists have more consciousness of intellectual property pledge financing, it make a lot of help in intellectual property pledge financing activities of laws and regulations. However, they do not actively seek for enterprises to provide them with relevant loans. Instead, they grade from the perspective of knowledge to provide credit evaluation services for small enterprises. The second is the Silicon Valley banking model, in which relevant venture capital firms provide loan services for small and medium-sized technology-based enterprises from the aspect of intellectual property mortgage financing, and guarantee the value of their intellectual property. But if the companies are unable to repay the loans, the intellectual property will eventually be taken back by the banks. Last but not least, it is the mode of guaranteed asset purchase price mechanism, which is mainly proposed by the American M-CAM Company. It provides credit guarantee for enterprises but does not directly provide loan service for enterprises. When the enterprise cannot repay the loan, M-CAM Company can purchase the intellectual property of the loan enterprise according to the purchase price in the contract.

Germany mainly adopts the risk allocation model, which apportions loan risks between the federal government and the state government, in which the federal government takes 39% of the loan risks, the state government takes 26% of the loan risks, and commercial banks take 7% of the loan risks, and guarantee institutions take 28% of the guarantee risks.

Japanese small and medium-sized technology-based enterprises mainly realize intellectual property pledge financing through the support of policy investment banks, which is a kind of direct debt financing in essence. In order to promote the development of technology-based small and medium-sized enterprises, the Japan Development Bank and the Hokkaido Development Bank formed the present Japan Policy Investment Bank through the reorganization. Small and medium-sized enterprises can directly mortgage their intellectual property to Japan’s policy investment bank to obtain loans. Before issuing loans, Japan Policy Investment Bank will entrust evaluation agencies to carry out value and risk assessment, and check the credit of enterprises, and provide loans to enterprises according to the evaluation results and corresponding mortgage loan standards.

Next, we can see from the research methods of foreign scholars on intellectual property pledge financing.

Kang B and Chen X (2008) put forward the multi-objective decision-making method, which is different from the cost method, income method and market method, but

carries out correlation analysis on the influencing factors of the value of intellectual property and evaluates the value of intellectual property by constructing value model. Wang J (2010) studied the limitations of cost method, marketing method and Luke method from the perspective of national intellectual property value evaluation, and proposed that factor analysis and fuzzy comprehensive evaluation should be introduced into intellectual property value evaluation. D'Agostino RJ (2012), in his research on the evaluation of intellectual property values, proposed a method that could use computers, which could reduce the error of the evaluation value to a certain extent.

Foreign scholars' studies on the value assessment of intellectual property pledge financing mainly focus on the value assessment of pledged assets. Wonglimpiyarat (2012) believes that intellectual property pledge financing is very important for start-up technology companies, but its value assessment is a difficulty. Therefore, Silver L (2016) proposed that it is necessary to improve the cognitive ability of banks on intellectual property pledge financing, so as to better promote the financing of small and medium-sized technology companies and solve the problem of capital difficulties.

For pledge party (bank), in addition to the value of intellectual property, the bank also need to face the financiers of credit problems, therefore, foreign scholars put forward based on the technology of intellectual property rights of credit evaluation model, the current main methods analytic hierarchy process (AHP), the decision tree method, regression method and so on, also has certain limitation, but the model should be built around a certain evaluation index on the basis of the data. On this basis, Grimaldietal (2015) proposed a relatively comprehensive value model, that is, patent portfolio information evaluation model. Although the evaluation is more comprehensive, at present, it has not reached the practical level.

To sum up, foreign scholars research focus mainly concentrated in the study of intellectual property value assessment model, through the way of building related value model to solve the defect of traditional evaluation method, comparatively leading its research level, but also note that the foreign scholars put forward the value evaluation model is only a theory, from real comprehensive practice there are still some gaps.

2.2 Domestic Research Status

From the perspective of China's intellectual property pledge financing mode, China mainly adopts the following two modes.

The first is the market-led model. This mode mainly takes the market as the main body, attaches importance to the law of market change, and the government has little intervention to it. It encourages small and medium-sized technology-based enterprises to carry out intellectual property pledge financing with the market as the orientation, and the government does not provide any subsidy or risk bearing system. The government mainly plays the role of supervisor and service provider. By constantly improving the corresponding laws and regulations and service platform, a good environment is provided for the development of intellectual property pledge financing services. In the process of intellectual property pledge financing for small and medium-sized technology-based enterprises, evaluation agencies and law firms mainly undertake the responsibility of intellectual property value assessment and financing risk assessment, and then the enterprises will share the evaluation results with financial institutions to obtain financing opportunities. More typical case is the Xiangtan city take a top-down intellectual property pledge financing, the government not enterprises and commercial Banks to intellectual property pledge financing activity intervention, also does not provide any subsidies or policy risk, if the enterprise can't repay the loan in time, the commercial Banks will be independently bear all losses.

The second is the market-oriented mode under the guidance of the government. In this mode, the government for intellectual property pledge financing activities mainly take financial support or intervention, in the form of government credit and government in this process is mainly plays the role of the facilitator and guide, mainly through formulate corresponding laws and regulations and the corresponding service platform was constructed, which provide reasonable for intellectual property pledge financing platform, at the same time can also subsidies to small and mid-sized enterprise by means of financial support, to guide the small and mid-sized enterprise intellectual property pledge financing activities actively, and to the risk of intermediary institutions to provide certain subsidies, if necessary can take advantage of government credit guarantee for the enterprise. Such as the government of the south China sea in order to promote intellectual property pledge financing activities, set up intellectual property trading platform, small and medium-sized enterprises loan material only through intellectual property rights exchange and law firm to investigate and check after, can to Hainan intellectual property office, which is to recommend to the financial institutions and the intellectual property office, financial institutions after receive recommendations, by appraisal agency, if audit and correct can provide loan opportunities.

Then it is also the research method of intellectual property pledge financing in China by domestic scholars.

Gong Kexin (2016) took the rights of network literature, film and television adaptation as the research object, and specifically discussed the status quo and existing problems of IP value evaluation in China. Taking pharmaceutical enterprises as an example, Peng Yuming (2017) analyzed the advantages and disadvantages

of the traditional value method, and pointed out that institutional investors could use the new method of fuzzy relationship for value evaluation. Luo Zixuan (2018) took China's science and technology companies as examples to illustrate the role of triangular fuzzy number analytic hierarchy process (TFHP) in the value evaluation of knowledge rights, and proved that the method was more reasonable than the traditional basic evaluation method through empirical evidence. Wen Jiahong (2018) believes that intellectual property can be regarded as a call option, and uses Black-Scholes option pricing model to verify the feasibility of this idea. Through empirical analysis, it is concluded that the option model can obtain the evaluation value of intellectual property to a certain extent. Li Chunhui (2018) took high-tech small and medium-sized enterprises as the research object, studied the rationality of the pledge coefficient, and proposed that the model of the pledge coefficient could be established according to the fuzzy synthesis method. Zhou Zhu and Yang Fang (2018) put forward how to correctly use the value evaluation method, and believed that when using the income method to evaluate the intellectual property value, the evaluation should be based on the evaluation influence factors. Li Xinai and Gao Zhiwei (2019) analyzed multiple influencing factors of intellectual property evaluation and studied the applicability of the three evaluation methods, and found that the income method is the most suitable method for intellectual property evaluation in China at present. Hou Haiwang (2019) believes that the key to solving the problem of intellectual property value evaluation lies in the coordinated development of the same technology. Sun Jie and Bian Chengxiang (2019) took value evaluation as the core point to study the investment decision analysis of operating funds and put forward relevant improvement measures. Wang Lei (2019) believes that intellectual property value assessment plays an important role in the market and can play a key role in the listing and rights protection of enterprises. Xiao Xia, Luo Yang and Yi Hui (2019) take small and medium-sized technology companies as research objects and put forward the "1+1" intellectual property value evaluation method, which evaluates the intellectual property value and operation quality of enterprises. They prove through empirical evidence that this method has overcome the defects of traditional value evaluation to a certain extent.

To sum up, Chinese scholars on the intellectual property is primarily focused on the intellectual property rights in the study of value model, and foreign scholars, research materials in this field is relatively lack in our country, not form a system of theoretical basis, stays at a theoretical level, most of the literature has not yet been applied to practice, therefore, our country need further thorough study about the field.

3. RELATED CONCEPTS AND THEORETICAL BASIS

3.1 Relevant Concepts

3.1.1 Definition of Intellectual Property Rights

The term intellectual property, or IP for short, first appeared in France, but there was no clear definition of intellectual property right at that time, until the Belgian scholar Picardy put forward a definition: "All rights from intellectual activities are intellectual property rights." Later, in the 1960s, the term "intellectual property" appeared in the World Intellectual Property Organization Convention, and "intellectual property" officially came into the international field of vision.

Intellectual property rights, as intangible assets, refer to the results obtained by people after a certain amount of intellectual work and to which they have ownership. Intellectual property can be divided into broad sense and narrow sense. The broad sense of intellectual property refers to patent right, copyright, trademark right, etc., while the narrow sense of intellectual property refers to patent right, which is also the main research object of this paper.

3.1.2 Definition of Intellectual Property Pledge Financing

Pledge means that the debtor or a third party transfers its assets or rights to the creditor and takes the assets or rights as the "security" of the creditor's right. Intellectual property pledge means that the intellectual property (patent right, trademark right) owned or controlled by the debtor or the third party is used as the guarantee of the creditor's right, and the debtor enjoys the corresponding rights and obligations. It is a kind of right pledge. Intellectual Property Pledge Financing is a financing method in which the intellectual property is taken as "collateral", the intellectual property is transferred to the creditor after a certain evaluation procedure, and the loan is repaid in accordance with the agreed interest rate and term after the loan is obtained from the bank or other financial institutions.

At present, there are three main modes of intellectual property pledge financing in China, namely Beijing mode, Shanghai Pudong mode and Wuhan mode. Beijing Model is a market-oriented loan model of intellectual property pledging which is dominated by bank innovation. Shanghai Pudong mode is government-led and belongs to indirect financing mode, which mainly consists of "bank + government guarantee + intellectual property counter guarantee". Wuhan mode is a hybrid financing mode, which integrates Beijing mode and Shanghai Pudong mode. In this mode, a professional guarantee institution -- Wuhan Science and Technology Company plays an "intermediate role". This mode reduces the risks of banks to a certain extent. The case adopted in this paper belongs to the Beijing model, which directly pledges and obtains financing through bank loans.

3.1.3 Definition of Intellectual Property Pledge Financing Evaluation

Intellectual property pledge belongs to the scope of assets evaluation, so this article about the definition of intellectual property pledge financing evaluation will also be defined from the Angle of assets evaluation: evaluation of intellectual property pledge financing is estimated by appraisal institution according to entrust the intellectual property rights and issue the evaluation report, provide a reference basis to the pledgee financing behavior of a professional service.

3.1.4 Valuation of Intellectual Property Rights

Yin Tongyang (2011) pointed out that intellectual property value evaluation is a comprehensive evaluation of the value of intellectual property based on the basic evaluation methods adopted by relevant practitioners. Generally speaking, the actual value of intellectual property is not necessarily the same as the assessed value, and the value of intellectual property is different under different evaluation methods and purposes. Therefore, when evaluating the value of intellectual property, the first thing to consider is the purpose and method of evaluation, so as to obtain a more reasonable evaluation value.

Zhang Guiqun (2016) points out that intellectual property itself does not have value. Only after an objective evaluation of intellectual property can intellectual property have certain value and can be used to pledge financing. This process requires relevant appraisal institutions and appraisers to evaluate intellectual property rights in a reasonable manner in accordance with certain laws and regulations.

3.1.5 Characteristics of Intellectual Property Value Evaluation

a) The expected future income of intellectual property valuation is full of uncertainty

Intellectual property is different from tangible assets. In the process of evaluating its value, it is impossible to judge its actual value by its appearance. In addition, the expected future returns of intellectual property rights are full of uncertainties, which means that the analysis of the expected future returns needs to take into account as many factors as possible to show the objectivity of the evaluation results.

b) The evaluation of intellectual property needs to adopt scientific methods

Intellectual property value assessment method, generally speaking, there are income method, cost method, market method, but these three methods has certain limitation, so in the practical value evaluation, rating agencies usually adopts the value model of intellectual property rights in a way that is more scientific and reasonable evaluation, in order to ensure maximum assessment results close to its real value.

c) The value of intellectual property varies according to the purpose of assessment

Under different evaluation purposes of intellectual property value assessment results are different, although in the value assessment will be based on market prices to differential value of intellectual property adjustment, but in the process of actual transaction, the assessment purpose will largely affect the final evaluation value, such as intellectual property evaluation purpose is to sell and financing, so in general, the financing under the purpose of assessment value will be lower than to sell under the purpose of evaluation.

3.2 Theoretical Basis

3.2.1 Intellectual Property Value Theory

a) Labor theory of value

The "labor theory of value" was first mentioned by William Petty in "Taxation Theory". He believed that the labor time determines the value of goods is the labor theory of value. In 1776, Adam Smith made a distinction between use value and value in The Wealth of Nations, believing that labor is the true measure of the exchange value of all commodities. David Ricardo, based on Adam Smith's theory, will present a view that includes labor and materialized labor. Finally, Marx explained the "labor theory of value" deeply on the basis of his predecessors' research on labor theory of value, and believed that the value of goods is determined by the undifferentiated human labor condensed in goods.

The labor theory of value mainly consists of four aspects: the principle of two factors of goods, the principle of duality of labor, the determination of quantity of commodity value and the law of value. The value of goods belongs to the economic category, and the final value of goods is embodied through transformation. According to Marx's theory, the value of a commodity is determined by the amount of labor condensed in the commodity. Therefore, the value of a commodity can only be realized through exchange, and the price tends to change with the change of value.

According to the labor value theory, the value of intellectual property is determined by the socially necessary time. Therefore, the socially necessary labor time is a reference for the evaluation. Secondly, socially necessary labor time affects the pledge value of intellectual property. Moreover, the realization of the value of intellectual property tends to fluctuate around the value.

b) Value theory of utility

Utility axiology is a theory that people evaluate goods with subjective viewpoint. Balben put forward in the middle of the 19th century: "The value of a commodity comes from its use value, and the value of a commodity is determined by its utility. If it has no effect or value on people, it will have no value". In the 18th century, Galliani added that "the value of a commodity is determined not only by its utility, but also by its scarcity". In the first half of the 19th century, Say and Gossen put forward the

utility value theory with consumer psychological feelings as the core, emphasizing more on the effect of consumer psychology on commodity value. In the 1870s and 1880s, on the basis of previous theories, Pompawerk and others gradually formed a theoretical system of value with marginal utility as the analysis method.

The theory of utility value consists of four parts: the determination of value quantity, the basic law of price formation, the source of commodity value and the law of diminishing marginal utility. The determination of value quantity is decided by its marginal utility; The basic law of price formation is to follow the final price formed in the competitive market between buyers and sellers. The source of commodity value is subjective value, that is to say, whether a commodity has value is determined by people's demand psychology; The law of diminishing marginal utility is the relationship between goods and the satisfaction of consumers' psychology, which is inversely proportional.

As far as utility value theory is concerned, it can be used as the theoretical basis of income method to evaluate intellectual property. The biggest characteristic of the utility value theory is the subjective color. However, in the process of using the income method to evaluate intellectual property, part of the evaluation parameters cannot be effectively evaluated objectively and will have a certain subjective color, which meets the commodity value source of the utility value theory.

3.2.2 Financing Theory of Intellectual Property Pledge

a) Theory of external financing

Exogenous financing theory, proposed by American economists Gurley and Shaw, refers to enterprises raising funds from other economic entities other than enterprises through issuing stocks, bank loans, bonds and other ways. However, with the development of The Times, internal financing has been unable to meet the needs of enterprises. Nowadays, most enterprises choose to raise funds by means of external financing, and pledge financing loan is one of the external financing.

b) Priority financing hypothesis theory

According to the theory of priority financing hypothesis, general enterprises (listed) will follow a certain order of priority when choosing financing, that is, when there is information asymmetry, for example, when the stock value is high, enterprise managers will use internal information to issue new shares to raise funds. When a company issues new shares, investors tend to lower its share price, resulting in a decline in the value of the shares. Enterprise financing, therefore, will be based on cost minimization principle, and in general, the enterprise is the first "zero cost" of endogenous financing, but for most small and medium-sized enterprises, external financing is preferred, but no matter how to choose, enterprises follow the successively magnitude order of priority financing, so as to create more profits for the enterprise.

4. APPLICABILITY ANALYSIS OF INTELLECTUAL PROPERTY VALUE EVALUATION METHODS

At present, the most commonly used methods of asset evaluation are: cost method, income method and market method. This paper compares and analyzes the three methods of asset evaluation.

4.1 Cost Method

The cost method refers to the method to obtain the intellectual property value evaluation by subtracted the value of each loss based on the replacement cost, in which the loss includes functional loss, economic loss and substantial loss. The cost method is generally used to evaluate the lower limit of intellectual property rights of enterprises. This method is less affected by subjective factors, and the evaluation results are more objective.

Because the cost of intellectual property cannot be effectively calculated, the final assessment results are not convincing.

4.2 Income Method

The key of income method is to select parameters, including future income amount, income period, market share, discount rate and other parameters, and estimate the future income of intellectual property in a certain time in the future through calculation of relevant parameters. Compared with the other two evaluation methods, the income method is the most widely used evaluation method in the evaluation practice, and the evaluation results are relatively objective. As long as the evaluation object has benefits, this method can be used to calculate the evaluation value.

However, it is not easy to determine the value of the parameters of the income method, and the lack of the acquisition of relevant data limits the objectivity of the parameters. Subjective factors can not be avoided in the use of the income method to a large extent, and there are many factors that affect the future income of the assessed object, so the evaluation value of the objectivity can not be effectively determined.

4.3 Marketing

Market method is to select the market price of the existing types of evaluation objects in the market as the reference price, and then make differentiation adjustment to the evaluation objects. Compared with the other two evaluation methods, market method is the simplest and most effective evaluation method, and to a large extent, it realizes the objective evaluation standard.

However, the use of market law must be based on the premise of a mature market. For China, this requirement is not satisfied, which leads to the difficulty in finding references in the use of market law and the lack of objectivity in the final evaluation results, which mostly rely on artificial judgment.

4.4 Pledge Coefficient Method

As a very special asset, intellectual property will be affected by its characteristics in the process of evaluation, and its value will also be affected by many factors during the period of pledge, thus increasing the difficulty of evaluation. Therefore, in order to give a more reasonable and objective evaluation value of intellectual property, the evaluation agency will adopt the pledge coefficient method while adopting the basic evaluation method to modify the evaluation value under the basic method to some extent. The basic formula is as follows: the appraised value of the intellectual property pledge = the market value of the proposed intellectual property pledge * (1- the pledge coefficient)

4.5 Comparison and Analysis of Evaluation Methods

Among the three valuation methods introduced above, when it comes to the valuation of intangible assets such as intellectual property, the income method is usually the first choice; the market principle is applicable to the appraisal market with mature market; the cost method is based on the premise that there is available historical data and the depreciation of intellectual property can be reliably calculated. The evaluation method chosen in this case is the income method. Compared with the other two evaluation methods, the income method has the following advantages :(1) it is easy to calculate; (2) The evaluation value obtained is relatively objective; (3) high applicability.

Table 1
Comparative analysis of evaluation methods

Evaluation methods	Evaluate ideas	Involves the parameters	Use the premise
Market method	Differentiation adjustment based on the value of the reference	Reference transaction price and adjustment coefficient	A fully active public market is comparable to the constant use of assets for trading activity
Cost method	Subtracting various devaluations from replacement costs	Replacement cost depreciation rate	With available historical data depreciation can be measured reliably
Income approach	Discount expected future earnings	Expected earnings Fixed number of year of the earnings The discount rate	Future expected revenue, revenue years and risks can be reliably predicted and measured

In general, the same assessment object assessment values of different evaluation methods are different, in terms of intellectual property, income method is the most suitable evaluation methods, but the income method is concluded that the market value of intellectual property rights, not under the pledge of intellectual property value, therefore, when the intellectual property rights involve the pledge, tend to be used in the evaluation process the combination of earnings method + pledge coefficient method, according to the adjustment of pledge coefficient obtained the final collateral value.

5. CASE STUDY ON THE VALUE EVALUATION OF INTELLECTUAL PROPERTY PLEDGE FINANCING

5.1 Intellectual Property Rights Related to Hangzhou Xiye Technology Co., Ltd

The intellectual property rights of Hangzhou Xiye Technology Co., Ltd. include invention patents, Copyrights, appearance design patents and utility model patents, including 4 invention patents, 2 control system software Copyrights, 4 appearance design patents and more than 30 national utility model patents.

5.2 Evaluating the Value of Intellectual Property by Income Method

To sum up the above three valuation methods, the income method should be adopted to evaluate the intellectual property value of Hangzhou Xiye Technology Co., Ltd., mainly based on the following three reasons. First, there are few references to be found in the market, and the problem of value deviation is likely to occur when the market method is adopted. Second, as for intellectual property, there is basically no replacement cost and loss involved, so the cost method is not applicable to its value assessment. Thirdly, the future income of intellectual property of Hangzhou Xiye Technology Co., Ltd. is calculable, so the income method is more appropriate.

Since the net profit of Hangzhou Xiye Technology Co., Ltd. is not disclosed to the public, the method of assumption is adopted in this paper to facilitate the value assessment of intellectual property. The following table assumes the net profit from 2015 to 2019.

Table 2
Net profit of Hangzhou Xiye Technology Co., Ltd. 2015-2019 (ten thousand yuan)

Year	2015	2016	2017	2018	2019
Net profit	232145.38	158251.58	121090.78	92634.35	60919.52
Net worth	902879.02	702729.65	555528.19	441456.91	362987.49

Hangzhou Xiye Technology Co., Ltd. is a technology-based company. Generally speaking, the average return on equity of growth technology companies is 15%, and the discount rate of Hangzhou Xiye Technology Co., Ltd. is assumed to be 15%. In terms of the income period, it is assumed that the net profit and net asset in the next 20 years will remain stable, that is, the net profit in the next 20 years will be 2,321,453,800 yuan and the net asset will be 9,028,792,200 yuan, so the net profit and net asset in the next 20 years can be calculated.

According to the formula: =A[]/r（r is the discount rate，I is years），=1902907820(Thousand yuan)，=489269600(Thousand yuan).

Assuming that the average net profit of the industry in 2035 is 15%, then the excess return brought by intangible assets is：-*，is 198124703.5 thousand yuan.

Taking a patent of Hangzhou Xiye Technology Co., Ltd. as an example, the appraised value is calculated by using the income method. Assuming that the value brought by the main major in 2035 is 198,124,703,500 yuan, the current appraised value of this patent is as follows:

P=/=F/，The appraised value of this patent is 4,377,575,800 yuan, so Hangzhou Xiye Technology Co., Ltd. can obtain the corresponding financing through the pledge of this patent.

5.3 Case Inspiration

Through the intellectual property value evaluation of Hangzhou Xiye Technology Co., Ltd., it can be found that, first of all, we need to determine the discount rate. In the process of calculation, I adopt the way of hypothesis, which is convenient for subsequent calculation. Since the operating data of Hangzhou Xiye Technology Co., Ltd. is not open to the public, this paper adopts the method of hypothesis to calculate net assets and net profits, which makes the final evaluation lack of some objectivity. Finally, the valuation of intellectual property is also based on hypothetical data, and the final calculation results are also lack of objectivity.

In the application of income method, there is some error in determining the value of parameters. Especially in the absence of relevant data, the value of parameters depends on manual determination to a large extent, which is the defect of income method. In order to reduce such errors, the number of relevant influencing factors can be increased in the process of using the income method to improve the objectivity of the evaluation results.

6. PROBLEMS IN THE VALUE ASSESSMENT OF INTELLECTUAL PROPERTY PLEDGE FINANCING AND COUNTERMEASURES AND SUGGESTIONS

6.1 Problems Exist in the Value Assessment of Intellectual Property Pledge Financing

a) The intellectual property evaluation mechanism is not perfect

The important link of intellectual property financing is the evaluation of intellectual property value. However, in view of the current development situation in China, the relevant evaluation laws and regulations are missing. The evaluation criteria of intellectual property relies on the evaluation criteria of tangible assets, and the actual value of intellectual property cannot be objectively evaluated. In addition, the establishment of intellectual property evaluation mechanism in China is just in the initial stage, and the relevant evaluation mechanism has not provided a clear standard for both market and evaluation.

b) Lack of relevant laws and regulations

At present, China has not issued relevant laws and regulations on intellectual property pledge financing. On the one hand, it is difficult to establish relevant laws and regulations because of the particularity of intellectual property. On the other hand, it is difficult to manage the registration of intellectual property pledge. The actual situation in each place is different, and there is no unified registration system, which leads to the long process of intellectual property pledge. In addition, for the entire asset appraisal industry, China is just in the initial stage, and it will take a long time for the establishment and implementation of relevant laws and regulations, which will also lead to various problems in the development of intellectual property pledge financing.

c) It is difficult to control the financing risk of intellectual property pledge

First, the complexity of intellectual property rights in the process of pledge is prone to legal risks; Secondly, the future income of intellectual property is full of uncertainty, and the future income is affected by many factors, but it is difficult to evaluate these factors. Thirdly, the evaluation method has some limitations. Once the evaluation method is used wrongly or the parameter value is not accurate, the evaluation risk will also appear. Fourthly, it is difficult to realize and circulate intellectual property. When the mortgagor fails to repay the debt, the credit risk of the borrower will also rise.

6.2 Suggestions for Value Assessment in Intellectual Property Pledge Financing

6.2.1 Improve the Laws and Regulations on Intellectual Property Pledge Financing

First of all, the intellectual property pledge financing system should be established and improved to solve the problem of the lack of relevant laws and regulations in China. Secondly, on the existing legal basis, the detailed rules of intellectual property pledge financing should be stipulated, the process and methods of the pledge should be clarified, and the standardized management should be strengthened. Finally, expand the scope of intellectual property pledge financing, although the intellectual property rights pledge can be used as a new financing way to solve the financing difficult problems in the enterprise, but the current can be used to the pledge of intellectual property rights or smaller, to a certain extent restricts some enterprises financing, so to expand the scope of the intellectual property pledge financing can make more and more enterprises have the opportunity to obtain financing.

6.2.2 Strengthen Risk Prevention and Management of Intellectual Property Pledge Financing

High risk has always been a problem in the process of intellectual property pledge financing, so it becomes very necessary to strengthen the risk prevention and management of intellectual property pledge financing. First, set up financing conditions, conduct a comprehensive assessment of the qualifications of applicants, to prevent applicants from being unable to repay debts. Secondly, the risk sharing mechanism should be established to minimize the risks in the process of intellectual property pledging. Third, the risk prevention mechanism should be improved, and the relevant risk problems should be preplanned, so that the risks can be effectively dealt with in the first time after they occur.

6.2.3 Innovate Value Evaluation Methods

At present, China can use cost method, income method and market method in the evaluation of intellectual property value, among which the most used is income method. However, these three evaluation methods all have certain limitations, which can not better evaluate the actual value of intellectual property. Therefore, China must accelerate the pace of innovation of intellectual property value evaluation methods, and strive to build a value model with strong practicality, so as to correct the parameter deviation in market law, so as to improve the objectivity of the final evaluation value.

CONCLUSIONS

As a new financing method, intellectual property pledge financing can solve the financing difficulties for small and medium-sized technology companies, and this issue has great research value. Based on the existing theories, this paper mainly discusses the following points: First, this paper studies the relevant theories of intellectual property pledge financing, and has a deeper understanding of the definition of intellectual property, intellectual property value evaluation, and characteristics of intellectual property value evaluation; The second is to study the applicability of the three basic assessment methods to understand their advantages and disadvantages; Thirdly, it discusses the application of income method in intellectual property value evaluation, and studies the defects of income method in practical application. Fourthly, it studies the problems of value evaluation in intellectual property pledge financing and puts forward some relevant suggestions.

In the process of writing this paper, due to my limited professional ability and relevant experience, the income method is just a simple data processing when evaluating the value of intellectual property without considering other influencing factors, and the final evaluation value is to be studied.

As for the above mentioned problems, I hope I can be able to solve them in the future and make a contribution to the value assessment of intellectual property pledge financing. At the same time, it is also hoped that China's asset appraisal industry can develop rapidly, innovate value appraisal methods in line with the national conditions, and help more appraisal agencies and relevant stakeholders to make the most accurate judgment.

REFERENCES

Bao, X. Z., & Huo, H. H. (2019). Risk formation mechanism and simulation analysis of intellectual property pledge financing. *Scientific Research, 37*(08), 1423-1434.

Che, Y. Y. (2020). *Research on financial innovation products of intellectual property capitalization* (Doctoral dissertation). Jilin University.

Chen, J. L. (2020). *Research on financing optimization of AM Technology Company based on intellectual property credit loan* (Doctoral dissertation).. Chongqing University of Technology.

Chen, Z. H., & Zhou, Z. J. (2019). Research on the evaluation index system of patent financing ability of high-tech enterprises. *Science and Technology Management Research, 39*(10), 133-138.

D'Agostino, R. J. (2012). *Computer-based method and system for appraising intellectual property: US*, US 20120011074 A1[P].

Dong, H. Z., & Yang, T. (2019). Research on the development of intellectual property pledge financing for small and medium enterprises in China. *Property Rights Guide*, (12), 31-35.

Gui, Z. Y., Yang, S. C., & Dong, X. H. (2020). Research on the value evaluation of national defense patent for civil use. *Finance and Finance,* (03), 72-77.

Guo, H. (2019). Discussion on the actual obstacles and path of intellectual property pledge financing in China. *Financial Development Research,* (08), 87-89.

Hansen, J., Hansen, J., et al. (2020). Risk diversification in intellectual property mortgage financing. *Journal of Management Science and Technology, 40*(04), 206-211

Hu, S. Y., & Sun, J. Y. (2020). Research on the financing problem of intellectual property pledge of technology-based small and medium-sized enterprises. *Liaoning Economy*, (06), 24-26.

Jiang, W. Y. (2019). Research on patent portfolio value evaluation from the perspective of pledging financing. Qingdao University.

Jin, W. (2019). The pledge of intellectual property rights in small and medium-sized enterprises. *Business Accounting,* (11), 107-108+123.

Li, Z. G. (2019). The legal dilemmas and countermeasures of intellectual property pledge financing for SMEs. *Science and Technology for Development, 15*(05), 524-532.

Liu, X. C. (2019). Research on intellectual property pledge financing service system of technology-based small and medium-sized enterprises. *Times Finance*, (34), 43-46.

Liu, Z. Y., Li, H. L., & Wang, L. (2020). Research on risk warning mode of enterprise intellectual property pledge financing based on FMEA method. *Economic Problems*, (02), 58-66.

Ma, J. F. (2019). *Research on legal risk prevention of intellectual property pledge in China.* Dalian Maritime University.

Silver, L., Lundahl, N., & Berggren, B. (2016). Revisiting control aversion: the role of financiers in connecting entrepreneurs to the marketplace. *Journal of Small Business & Enterprise Development, 22*(3), 417-432.

Special commentator of this newspaper. Intellectual property pledge financing helps accelerate the development of science and technology enterprises. *China Urban and Rural Financial News*, 2019-08-23(A01).

Sun, X., & Kan, Y. (2019). Intellectual property pledge financing: models, problems and countermeasures. *Financial Review,* (09), 96-100.

Wonglimpiyarat, J. (2021). Technology transfer and commercialization: Venture capital financing system of Thailand. *Journal of Private Equity, 16*(1), 42-55.

Xia, T., & Xing, L. (2019). Discussion on the realistic dilemma and future prospect of intellectual property pledge financing in China. *Legal Expo,* (24), 239+242.

Xing, Z. L., Ma, G. Q., Sun, Y. L., & Liu, G. J. (2019). The "Shaanxi Mode" of intellectual property pledge financing. *Science and Technology of Chinese Universities*, (06), 27-31.

Yu, H. Q. (2019). *Research on intellectual property network financing insurance system of technology small, medium and micro-sized enterprises*. Southwest Jiaotong University.

Yuan, S. (2020). Current Situation, Review and Correction of Intellectual Property Pledge Financing in the New Situation -- From the Perspective of Liaoning Private Science and Technology Enterprises. *Modern Economic Information,* (03), 146-147.

Yuan, Z., M., & Sun, Y. P. (2019). Can Intellectual Property Pledge Financing Risk Dilemma Be Solved? Research based on random forest model. *Guangdong Social Sciences,* (06), 24-35.

Zhan, A. L., Li, Y. J., & Lai, W. J. (2020). Risk Compensation Mechanism of Intellectual Property Pledge Financing: International Experience and Zhejiang Practice. *Journal of Zhejiang University of Technology (Social Science Edition), 19*(01), 74-80.

Zhang, M. R. (2020). *On legal issues of intellectual property pledge financing in China's small and medium-sized technology enterprises* (Doctoral dissertation). Hebei University of Economics and Business.

Zhou, J. N. (2020). *Research on risk management of patent pledge loan in China* (Doctoral dissertation). Yunnan University of Finance and Economics.

Zhu, H. (2019). *A case study of intellectual property pledge financing*. Guangzhou University.

Zhu, J. (2019). Research on Industry Status Quo and Risk Prevention Measures of Intellectual Property Pledge Financing. *Modern Economic Information,* (21), 293.